



LEFT Greenwood Sanctuary @ Admiralty

Benchmarking Sustainable Landscapes

Green Mark for Parks

Text by Neil Power and Kannagi Sekar
Photography by Dexian Feng

"In many ways the environmental crisis is a design crisis. It is a consequence of how things are made, buildings are constructed, landscape is used."
-Sym Van der Ryn

The constructed landscape inevitably brings about accompanying environmental changes and has the potential for environmental improvement as well as damage. In conceiving and creating urban landscapes, it is imperative to make environmentally responsible choices. To this end, the benchmarking of sustainable landscapes is instrumental in providing guidelines for designing and constructing landscapes with careful consideration to the various aspects that would contribute to the long-term sustainability of the constructed landscape. The tenets for creating sustainable landscapes are encompassed in the Green Mark for Parks framework for the sustainability assessment of parks.

If the design and construction are based on sound triple-bottom line sustainability principles, the constructed landscape would be able to contribute to not only the resilience of the site but also the entire ecosystem. One of the great things about adding organic matter to soils is that it builds soil resilience to environmental and use stresses. Similarly, one of the great things about applying triple-bottom line sustainable design principles to landscape design is that it builds resilience in the landscape to environmental, social and economic stresses.

The Green Mark for Parks scheme is designed to evaluate sustainability of landscapes, focusing on resource management, quality and environmental outcomes of the constructed landscape. The aim is to inspire and promote improvements in landscape and create public recognition for such landscapes. It is also a means to benchmark the parks.

Sustainable Landscapes

What is a sustainable landscape?

A sustainable landscape is one that aspires to be resource self-sufficient and yield significant reductions in resource consumption and waste production, while enabling the built landscape to support some natural ecological functions by protecting existing ecosystems and regenerating some ecological capacity where it has been lost. A sustainable landscape also functions to meet societal needs for recreation, community cohesion, health and other functions, within its fiscal capacity.

The approaches towards creating sustainable landscapes encompass numerous principles that address environmental, social and economic issues related to the design, construction, implementation and management of landscapes. The realm of sustainable landscape design and development is expanding in response to environmental concerns centred on numerous interlinked environmental and social issues.

Why benchmark sustainability of landscapes?

As sustainable design and development principles move from the fringe to the mainstream, there is now greater impetus for planners, designers, developers and policy makers to incorporate these principles into their strategies and approaches toward the creation of sustainable landscapes. Sustainable approaches work holistically to integrate thoughtful design, construction, operations and maintenance, which can enhance and restore ecosystem services that would otherwise be lost. To this end, sustainable performance benchmarks will enable constructed landscapes to support natural ecological functions by protecting existing ecosystems and regenerating ecological capacity where it has been lost.

Ecosystem services provide benefits to humankind and other organisms but are generally not reflected in our current economic accounting. Though there have been efforts to determine the monetary value of ecosystem services, these are by and large not explicitly seen. With a sustainability benchmarking tool, the economic benefits are now increasingly discernible with tangible benefits from energy and water savings. Waste minimisation and recycling also contribute to monetary savings.

Beyond the holistic realisation of environmental and social benefits, we benchmark parks because it makes good economic sense. One of the features of the Green Mark for Parks scheme is that it allows benchmarks to measure the economic benefits of the provision of varying levels of environmental services and social goods. This framework allows for direct return on investment analysis to be drawn from varying levels of types and intensity of use, compared to their resource requirements over the life-cycle of the investment.

Other International Parks/ Landscape Assessment Frameworks

In developing the Green Mark for Parks assessment framework, other international parks and landscape assessment frameworks were examined.

Yardstick (NZ)

The Yardstick is a parks benchmarking initiative established in 2001 in New Zealand by the local authority park managers focused on parks and recreation activities. It has more than 45 New Zealand parks members and more than 35 Australian parks members, as well as some European members. This benchmarking tool is applicable to parks, open spaces, cemeteries and water parks, and collects and compares information relating to provision of services, best practices, cost of services, asset management and planning and policy formulation.

Green Flag (UK)

The Green Flag scheme is a national standard for parks and green spaces in England and Wales. It serves as a means of recognising and rewarding the best green spaces in the country and is applicable to parks, open spaces, cemeteries and water parks. The assessment looks at the capacity of the park to provide healthy, safe and secure recreational space that is well-maintained, approaches for conservation, heritage and community involvement and sustainable management practices.

Sustainable Sites Initiative (US)

The Sustainable Sites Initiative (SITES) is a performance benchmark and rating system for the design, construction and maintenance of sustainable landscapes. Created in partnership between the American Society of Landscape Architects (ASLA), the Lady Bird Johnson Wildflower Center at the University of Texas at Austin and the United States Botanical Garden (USBG), this voluntary national guideline and rating system encourages integrated, systems-based approaches to sustainable landscape design and development. The scheme is due for implementation in 2012.

Parks Base

Parks Base is a collaborative programme between Integrated Open Space Services (IOSS) and Parks and Leisure Australia (PLA), which commenced in 2008. It is a web-based programme, which collects, organises and reports on information about public open space planning and management. This programme has two subsets, namely: Knowledge Base, which is an online knowledge database for professionals in the fields of public open space, urban greenery, urban ecology, conservation and protected areas, land management, arboriculture, horticulture, soils, turf, recreation and sport, associated areas of sustainability and social research; and a Comparison Program, which allows monitoring of aspects of public open space planning and management by participating government authorities.

As the Building Construction Authority (BCA) and National Parks Board (NParks) sought a sustainability benchmarking system for landscapes that was based on an internationally accepted framework and that accounts for the triple-bottom line operational aspects of social, economic and environmental elements, the Green Mark for Parks scheme was conceived.

Green Parks for Marks

Background

The Green Mark for Parks has been developed by the Centre for Urban Greenery and Ecology (CUGE) of NParks, in collaboration with BCA, to establish a comprehensive and viable framework for evaluating the sustainability of parks. It is the first and only sustainability assessment scheme that adopts a triple-bottom line approach giving due consideration to the interlinked aspects of environmental, social as well as economic facets of constructed landscapes.

What does Green Mark for Parks hope to achieve?

The Green Mark for Parks initiative is meant to inspire and promote improvements in parks, as well as to raise public awareness of Green Mark certified Parks. It is also instrumental in according recognition to owners reaching parks sustainability benchmarks. This includes parks managed by NParks and other agencies, as well as private and commercial parks and gardens, both in Singapore and in other countries. Besides identification of best practices in park development, design, construction, management and maintenance, it

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also facilitates the incorporation and promotion of a virtual cycle of improvements in parks and creates public recognition of Green Mark Parks.

The Green Mark for Parks Scheme - Triple-bottom Line Approach

The Green Mark for Parks sustainability assessment criteria follows an internationally accepted building sustainability assessment framework and methodology. The sustainability assessment criteria are specifically developed for civic landscape areas examining social, economic and environmental sustainability. The added social and economic sustainability assessment criteria differentiate this assessment from those which are mainly focused on environmental assessment.

Urban parks vary widely in how effectively they satisfy social needs and provide environmental services in the context of their resource consumption and economic impact. Park sustainability assessment considers the economic balance between the social services and environmental services provided along a park functions continuum, according to the efficient deployment of available resources.

The environmental and social sustainability of parks is heavily dependent upon their economic sustainability. However, as most parks are provided as a community service obligation and do not have the direct full cost recovery plus profit requirements inherent with buildings, market forces do not readily determine or contain parks' capital and maintenance expenditure.

The Green Mark for Parks programme recognises that urban parks are provided for social purposes and, increasingly, the provision of environmental services. This requires the recognition that the amount of resources deployed in the development, management and maintenance of parks directly affects the degree in which the park satisfies community requirements and environmental services. Green Mark for Parks acknowledges these interlinking factors through the assessment criteria.

Green Mark Criteria and Rating

The process leading to and including award certification allows parks to be benchmarked for the first time against credible, quantitative, sustainable and environmentally friendly park standards that include components such as community involvement and conservation values. For a park to be awarded a Green Mark for Parks certification, it has to be subjected to a comprehensive assessment system. Under this system, parks are evaluated based on criteria, namely: waste and material minimisation, water efficiency, energy efficiency, sustainable park construction and development, park management practices, strategies for enhancing urban greenery and ecology, approaches towards conservation and heritage, and other green features, initiatives and innovations.

Candidate parks are awarded Green Mark accreditation based on criteria within two broad groups, Resource Self-sufficiency and Park Quality (for existing parks) and Park Design (for new parks). Within these two groups are a number of key assessment criteria categories.

Resource self-sufficiency – material utilisation, waste management, water and energy efficiency
Sustainable development means being able to support future economic and population growth while maintaining a quality living environment that is clean, green and healthy. Park development and maintenance consumes natural resources to varying degrees across the four main categories of 1) energy, 2) water, 3) waste generation and 4) materials application.

Assessment of the environmental sustainability of material resource utilisation includes measurement, monitoring and documentation of the materials used in the landscape during construction and maintenance. Effective waste reduction, reuse, recycling and disposal (particularly of hazardous waste) are considered in assessing the efficiency of material utilisation. Substituting alternative recycled materials during construction and renovation for natural resources (such as aggregate and timbers) is an example of resource optimisation.

Fresh water is an internationally critical resource requiring efficient management of the quantity and quality of water entering, consumed and exiting the landscape. The planning and implementation of water efficient strategies together with ongoing monitoring is required to ensure that best practices in water management are implemented in the landscape. This includes rainfall, recycled water (grey water or black water) and run-off. Harvesting and storage of water in reservoirs and soil together with efficient distribution and consumption are also key ingredients to water conservation.

Landscaping provides an opportunity to reduce society's carbon footprint through managing the sequestration of plant and soil life. To achieve this, we assess the efficient use and monitoring of energy in parks, minimising carbon emissions from maintenance and management activities. We also seek opportunities to maximise carbon sequestration through effective soil and plant management, while fulfilling the required landscape functions.

Sustainable construction involves the adoption of building designs, construction methods and materials that have low environmental impacts. This includes materials and resources from within the sustainability supply chains. The recycling and reuse of materials subsequently optimises the consumption of limited natural resources. The strategies adopted for sustainable construction aim to optimise the use of natural resources and pursue the greater use of recycled and renewable materials, so as to reduce our dependence on non-renewable resources.

Park Quality

Park quality benchmarks measure how well a park satisfies the function for which it was developed. This section examines and assesses environmental, social and economic functions. This includes conservation and heritage values, recreational opportunities, community engagement, environment education, park usage, operational standards and efficiencies. These values form an interacting matrix that influence the enriching experience a high quality park can offer. Green Mark for Parks acknowledges these inter-linking factors through the assessment criteria.

Integrated Landscape Health Management

Integrated pest management principles have been inherited from agricultural systems following the advent of the first green revolution in the early 1960's. This green revolution applied precise manufactured chemical agents to the agricultural landscape providing a great leap in land productivity for food production. Since the publication of Rachel Carson's *Silent Spring*, the indiscriminate use of manufactured chemicals has also been questioned for the unintended external effects beyond the farmyard.

The second green revolution, now needed to provide sufficient sustenance for a population of beyond nine billion people, will require a productivity shift that encompasses externalities along with the internal management of the production unit. Along with the renewed focus on soil quality in the 1990's and beyond, there is a focus on proactively maintaining the health of the landscape rather than reactive treatment of the symptoms of an unhealthy landscape.

Sustainable landscapes embrace landscape design, construction, management and maintenance that incorporate integrated landscape health management principles.

Park Design

With park design, not only do we take into account the sustainability principles of design and construction, we also incorporate future management and maintenance considerations. This ensures that the design does not compromise the ability of the landscape to be managed and maintained sustainably.

What distinguishes the Green Mark (Existing Parks) and Green Mark (New Parks Design)?

The Green Mark for Parks scheme comprises assessment framework for both existing parks as well as for the design and development of new parks. Essentially, the sustainability principles underpinning the criteria focus on the key areas of sustainable resource consumption, including strategies for resource self-sufficiency and including water and energy efficiency, use of sustainable materials, efforts towards recycling, waste minimisation and approaches towards conservation, measures for enhancing biodiversity, habitat creation and restoration. In both assessments, points are also accorded for green initiatives and innovative practices.

The distinguishing features in Green Mark for New Parks assessment include considerations of sustainability in the design of the landscape and strategies and approaches for waste management, resource efficiency, and environmental sustainability measures during the park development and construction stage. The Green Mark for Existing Parks gives consideration to performance benchmarks in park management practices.

A summary of the criteria for the two assessment schemes is shown below.

**GREEN MARK FOR EXISTING PARKS
 TO ACHIEVE GREEN MARK CERTIFIED
 50 POINTS**

**RESOURCE SELF-SUFFICIENCY
 MIN. 20 POINTS**

**PARK QUALITY
 MIN. 30 POINTS**

**ELECTIVE REQUIREMENT FOR RESOURCE SELF-SUFFICIENCY
 (Combination of the following items to meet 20 points)
 (MIN. 40 POINTS)**

**ELECTIVE REQUIREMENT FROM PARK QUALITY
 (Combination of the following items to meet 30 points)
 (MIN. 60 POINTS)**

PART 1 - Waste & Material Minimization [20 points]
 1-1 Waste & Material Monitoring
 1-2 Onsite Waste Recycling
 1-3 Provision of Recycling Facilities
 1-4 Waste Management Improvement Plans (3-year)
 1-5 Sustainable Construction

PART 4 - Park Management [40 points]
 4-1 Accessibility
 4-2 Recreational opportunities
 4-3 Visitorship
 4-4 Community Involvement
 4-5 Park Management

Part 2 - Water Efficiency [10 points] (Min 5 points required)
 2-1 Water Monitoring
 2-2 Potable Water Reduction
 2-3 Water Efficiency Improvement Plans (3-year)

Part 5 - Conservation & Heritage [15 points]
 5-1 Monitoring of Flora & Fauna Species
 5-2 Number of Exotic Species
 5-3 Greenery Provision
 5-4 Conservation & Restoration Plans (3-year)

Part 3 - Energy Efficiency [10 pts] (Min 5 points required)
 3-1 Energy Efficiency Index
 3-2 Energy Monitoring
 3-3 Energy Efficiency Improvement Plans (3-year)

Part 6 - Other Green Features (Min 5 points required)
 Carbon Accounting Framework
 Fuel-efficient park equipment
 Water sensitive urban design
 Rainwater harvesting
 Soil moisture capacitors monitoring system

ADDITIONAL 20 BONUS POINTS: RENEWABLE/CLEAN ENERGY

**GREEN MARK FOR NEW PARKS
 TO ACHIEVE GREEN MARK CERTIFIED
 50 POINTS**

**RESOURCE SELF-SUFFICIENCY
 MIN. 20 POINTS**

**PARK QUALITY
 MIN. 30 POINTS**

**ELECTIVE REQUIREMENT FOR RESOURCE SELF-SUFFICIENCY
 (Combination of the following items to meet 20 points)
 (MIN. 50 POINTS)**

**ELECTIVE REQUIREMENT FROM PARK DESIGN
 (Combination of the following items to meet 30 points)
 (MIN. 50 POINTS)**

PART 1 - Waste & Material Minimization
 1-1 Waste & Material Monitoring
 1-2 3R Management Plan

PART 4 - Park Management [40 points]
 4-1 Conservation
 4-2 Green vs. Grey
 4-3 Greenery Provision
 4-4 Native vs. Exotic
 4-5 Biodiversity Enhancement [Wildlife species enhancement]

Part 2 - Water Efficiency
 2-1 Irrigation System
 2-2 Use of Water Efficient Fittings
 2-3 Stormwater Management

Part 5 - Conservation & Heritage [15 points]
 5-1 Maintenance Accessibility
 5-2 Accessibility & Safety
 5-3 Amenities Cater for Profile of Demographic Design

Part 3 - Energy Efficiency [10 pts] (Min 5 points required)
 3-1 Active Energy Systems
 3-2 Passive Energy System
 3-3 Electrical Sub Metering

PART 6 - Park's Development & Construction Management
 6-1 Waste and Material Resource Management
 6-2 Water Efficiency Management
 6-3 Energy Efficiency Management
 6-4 Environmental Sustainability measure
 6-5 Site Operation Management

PART 7 - Green Innovation
 7-1 Other green initiatives adopted which are innovatives and have positive environment impact
 7-2 Renewable/ Clean Energy

Rating

The provision of a range of sustainability ratings provides a form of recognition for varying sustainability achievement. Some parks are evidently leaders in sustainability and will be recognised for this at the Platinum award level. Others are able to achieve varying degrees of excellence depending on both historical and current resource commitment.

The Green Mark Platinum certified park sets standards for world's best practices in the respective environmental, social and economic criteria. These parks are benchmarked and recognised as leaders in park design / management because of their considerable development and implementation of innovative best practices.

A Gold Plus Standard Green Mark Park utilises current best practices in most of the key environmental, social and economic criteria. These parks are benchmarked and recognised as experts in park management, whilst a Gold Standard Green Mark Park recognises early adopters of best practices in park management.

Certified Green Mark Parks are likely to have demonstrated that they have exceeded the minimum environmental, social and economic sustainability standards as benchmarked across similar "best fit" parks.

Green Mark Certified Parks

The list of Green Mark certified parks includes flagship parks managed by NParks, parks under the jurisdiction of Jurong Town Corporation and the Housing Development Board. Increasingly, there is interest in the Green Mark for Parks sustainability assessment scheme from private organisations including commercial and residential developers.

To date, 13 parks have been certified under the Green Mark for Existing Parks scheme. 2 pilot projects have been awarded under the Green Mark for New Parks scheme with a number of parks awaiting certification under the Green Mark for New Parks scheme.

Moving Forward

Growing interest in Green Mark for Parks in the region

As the sustainability movement gains momentum, there is now greater impetus for organisations to leverage on the recognition accorded as a result of Green Mark certification. Besides providing recognition in terms of an award, the Green Mark for Parks serves as a repository and knowledge base of best practices for organisations to emulate and adapt. It is a source of knowledge base for creating awareness of latest strategies and approaches for sustainable practices and leading edge technologies.


Forging partnerships

Greater synergies can be harnessed in working with like-minded organisations such as Parks and Leisure, Australia, which see value in adopting the guidelines of creating and managing sustainable landscapes as well as forging of partnerships.

Beyond our shores

There is potential for Green Mark for Parks scheme to be exported on a regional basis, as the assessment scheme embraces a universal framework applicable to landscape industries regionally and globally. A pilot trial study on the Green Mark for Parks criteria was undertaken in Brisbane, Australia in 2007. An agreement has been signed between CUGE and Parks and Leisure, Australia to roll out Green Mark for Parks scheme in Australia. Similarly, there is potential to fulfil needs for sustainability assessment schemes in neighbouring countries and further regionally.

Future of Green Mark for Parks

With increasing success and interest, plans in the pipeline for widening the scope and reach of the Green Mark scheme include Green Mark for Sports Fields and Green Mark for Nurseries. With increasing support, awareness and recognition for the creation of sustainable landscapes, the boundaries for Green Mark are expected to expand. 

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